Claims

1. A circuit arrangement, for generating an x-ray tube voltage, comprising:

an inverse rectifier circuit (G_{si}) for generating a high-frequency alternating voltage,

a high-voltage generator (G_{su}) for converting the high-frequency alternating voltage into a high voltage for the x-ray tube ,

a voltage controller (G_{RU}), which based on a deviation of an x-ray tube voltage ($V_U(t)$) from a set-point x-ray tube voltage ($W_{U(t)}$) generates a first controlling variable value ($Y_{U(t)}$)for the inverse rectifier circuit (G_{si}),

a measurement circuit for measuring an oscillating current ($i_{sw(t)}$) applied to one output of the inverse rectifier circuit (G_{si}) of the high-frequency alternating voltage,

an oscillating current controller (G_{RI}), which based on a deviation of an ascertained actual oscillating current value ($V_I(t)$) from a predetermined maximum oscillating current value (W_{I_max}) generates a second controlling variable value ($Y_{I(t)}$) for the inverse rectifier circuit (G_{si}), and wherein

a switching device, connected downstream of the voltage controller (G_{RU}) and the oscillating current controller(G_{RI}), operable to compare the first controlling variable value ($Y_{U(t)}$)and the second controlling variable value ($Y_{I(t)}$) and is operable to send the lesser of the first and second controlling variable values ($Y_{U(t)}$ and $Y_{I(t)}$) onward as a resultant controlling variable value ($Y(t)$) to the inverse rectifier circuit (G_{si}).

2. The circuit arrangement as of claim 1, wherein at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}) includes a PI controller.

3. The circuit arrangement as of claim 1, wherein one output of the switching device is connected to at least one of the voltage controller (G_{RU}) and of the oscillating current controller (G_{RI}); and that the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}) are such the resultant controlling variable value ($Y(t)$)is carried along, if neither one of the controlling variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their respective controllers is sent onward as the resultant controlling variable value ($Y(t)$).

4. The circuit arrangement as of claim 2, wherein one output of the switching device is connected to at least one of the voltage controller (G_{RU}) and of the oscillating current controller (G_{RI}); and that the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}) are such the resultant controlling variable value ($Y(t)$)is carried along, if neither one of the controlling variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their respective controllers is sent onward as the resultant controlling variable value ($Y(t)$).

5. The circuit arrangement as of claim 1, wherein the switching device is such that no controlling variable lower than a predetermined minimum controlling variable value (Y_{min}) is sent onward as the resultant controlling variable value ($Y(t)$)to the inverse rectifier circuit

(G_{si}).

6. The circuit arrangement as of claim 4, wherein the switching device is such that no controlling variable lower than a predetermined minimum controlling variable value (Y_{min}) is sent onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}).

7. The circuit arrangement as of claim 1, wherein switching device is such that no controlling variable higher than a predetermined maximum controlling variable value (Y_{min}) is send onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}).

8. The circuit arrangement as of claim 6, wherein switching device is such that no controlling variable higher than a predetermined maximum controlling variable value (Y_{min}) is send onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}).

9. The circuit arrangement as of claim 1, wherein at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}) can vary at least one parameter, the at least one parameter being a function of at least one of a set x-ray tube voltage ($U_{Rö}$) and a set x-ray tube current ($I_{Rö}$).

10. An x-ray generator having a circuit arrangement of claims 1.

11. An x-ray generator having a circuit arrangement of claim 8.

12. An x-ray system having an x-ray generator of claim 10.

13. A method for generating an x-ray tube voltage where a high-frequency alternating voltage is generated via an inverse rectifier circuit (G_{si}), the high-frequency alternating voltage is converted into a high voltage for the x-ray tube v a high-voltage generator (G_{su}), and a first controlling variable value($Y_{U(t)}$) is generated for the inverse rectifier circuit (G_{si})via a voltage controller (G_{RU}) due to a deviation of an x-ray tube voltage ($V_U(t)$) from a set-point x-ray tube voltage ($W_{U(t)}$), the method comprising:

measuring an oscillating current ($i_{sw(t)}$) via a measurement circuit that is connected to one output of the inverse rectifier circuit (G_{si}) of the high-frequency alternating voltage,

generating a second controlling variable value ($Y_{I(t)}$) for the inverse rectifier circuit (G_{si}) via an oscillating current controller (G_{RI}), due to a deviation of an ascertained actual oscillating current value ($V_I(t)$) from a predetermined maximum oscillating current value (W_{I_max}),

comparing the first controlling variable value ($Y_{U(t)}$)and the second controlling variable value ($Y_{I(t)}$) via a switching device, the switching device being connected downstream of the voltage controller (G_{RU}) and the oscillating current controller(G_{RI}), and

sending the lesser of the first and second controlling variable values ($Y_{U(t)}$ and $Y_{I(t)}$) onward as a

resultant controlling variable value ($Y(t)$) to the inverse rectifier circuit (G_{si}).

14. The method as of claim 13, further comprising using a PI controller in at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}).

15. The method as of claim 13, further comprising feeding back the resultant controlling variable value ($Y(t)$) as an input value to at least one of the voltage controller (G_{RU}) and/or to the oscillating current controller (G_{RI}), and carrying along the resultant controlling variable value ($Y(t)$), if neither one of the controlling variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their respective controllers is sent onward as the resultant controlling variable value ($Y(t)$).

16. The method as of claim 14, further comprising feeding back the resultant controlling variable value ($Y(t)$) as an input value to at least one of the voltage controller (G_{RU}) and to the oscillating current controller (G_{RI}), and carrying along the resultant controlling variable value ($Y(t)$), if neither one of the controlling variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their respective controllers is sent onward as the resultant controlling variable value ($Y(t)$).

17. The method as of claim 13, further comprising sending onward as the resultant controlling variable value ($Y(t)$)to the inverse rectifier circuit (G_{si}), via the switching device, a controlling variable not lower than a predetermined minimum controlling variable value (Y_{min}).

18. The method as of claim 14, further comprising sending onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}), via the switching device, a controlling variable not lower than a predetermined minimum controlling variable value (Y_{min}).

19. The method as of claim 13, further comprising sending onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}), via the switching device, a controlling variable not higher than a predetermined maximum controlling variable value (Y_{max}.

20. The method as of claim 14, further comprising sending onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}), via the switching device, a controlling variable not higher than a predetermined maximum controlling variable value (Y_{max}.

21. The method as of claim 12, further comprising varying at least one parameter within at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}), the at least one parameter being a function of at least one of a set x-ray tube voltage ($U_{Rö}$) and a set x-ray tube current ($I_{Rö}$).

22. The method as of claim 14, further comprising varying at least one parameter within at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}), the at least one parameter being a function of at least one of a set x-ray tube voltage ($U_{Rö}$) or a set x-ray tube current ($I_{Rö}$).